DOCUMENT RESUME

ED 141 341 SP 011 226

AUTHOR Iomen, Blaine D.
TITLE The Effects of Straight Running as a Preliminary Maneuver on the Wedge and Wedge Turn.
PUB DATE May 77
NOTE 37p.

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS Learning Processes; *Perceptual Motor Coordination; *Physical Education; Skill Development; *Teaching Methods; *Transfer of Training
IDENTIFIERS *Skiing

ABSTRACT

This study was made to investigate the effect of the straight running exercise on learning the wedge and wedge turn in skiing. Twenty novice skiers volunteered to take part in this study. Half of the students formed the experimental group, which used straight running as a preliminary exercise to the wedge and wedge turn. The other half made up the control, which did not use straight running in the teaching sequence. It was concluded that the ability of a student to learn the wedge and wedge turn was not dependent upon practicing straight running as a preliminary maneuver. (JD)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED141341

CALIFORNIA STATE UNIVERSITY, NORTHRIDGE

THE EFFECTS OF STRAIGHT RUNNING AS A PRELIMINARY MANEUVER ON THE WEDGE AND WEDGE TURN

A paper submitted in partial satisfaction of the requirements for Perceptual Motor Learning in

Physical Education

by

Blaine D. Lomen

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

May, 1977

SP 011 226

TABLE OF CONTENTS

LIST OF TABLES iv

CHAPTER

I. INTRODUCTION 1

The Problem
Statement of the Problem
Importance of the Problem
Hypothesis
Scope and Limitations
Assumptions
Definition of Terms

II. REVIEW OF LITERATURE 6

Teaching Methods Presently Used
Transfer of Training
Task Difficulty
Specificity of Learning

III. RESEARCH PROCEDURES 13

Selection and Assignment of Subjects
Orientation of Subjects
Experimental Design
Training and Testing Procedures
Scoring Procedures
Statistical Design

IV. ANALYSIS AND DISCUSSION 16

Objectivity of the Judges
Data
Discussion of the Findings

V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS 19

Summary
Conclusions
Recommendations for Further Study

BIBLIOGRAPHY 22

APPENDICES 26

Apendix A: Scoring Criteria for Judges

Apendix B: Raw Data From Experimental Group

Apendix C: Raw Data From Control Group

LIST OF TABLES

Table		Page
1.	Objectivity of the Judges	16
2.	Comparison of Mean Gains for Groups	17

CHAPTER I

INTRODUCTION

The evolution of teaching methods has been directed by established experts in the field of ski teaching. Their aim has been to make skiing and the teaching of skiing as practical and functional as possible with the greatest amount of improvement and efficiency on behalf of the skier. The wedge and wedge turn are important maneuvers to the sport of skiing and the development of teaching methods. They are the backbone of all turning maneuvers in the intermediate and advanced stages of skiing (27:5-7). The wedge and wedge turn which is taught by instructors is preceded by an initial sliding maneuver, straight running.

The Professional Ski Instructors of America developed the American Teaching Methods, A. T. M., manual (27:13) which establishes straight running as a preliminary maneuver to the wedge and wedge turn. The A. T. M. manual was developed from practical experience by established experts in the field of skiing. It is a pragmatic approach that does not necessarily agree with motor learning theories. Specifically, the questions that are raised in this paper that do not agree with motor learning theories is the theory of task difficulty and the law of specificity. The problem of this study is to investigate the methods being used in relation to established motor theories.

The Problem

Statement of the Problem

The problem investigated in this study was the effect that teaching straight running had on learning the wedge and wedge turn.

Importance of the Study

Since relatively little research has been done on the teaching sequence of ski instruction this study is important to ski instructors nationally. The intent of this examination of the instructional sequence was to determine whether the elimination of the sequential maneuvers in the A. T. M. manual would make a difference in the learning process. This, in turn, could decrease the learning time of the student which is one of the objectives of the A. T. M. Elimination of a maneuver also simplifies the learning process for the student. Also, the results of this study will be sent to the P.S.I.A. Technical Committee for consideration which could have an ultimate effect on instructors throughout the United States.

Hypothesis

The study was conducted to test the following null hypothesis:

There will be no significant difference in improvement between the group being taught straight running as a preliminary maneuver to the wedge and wedge turn and the group being taught to make a wedge then wedge turn. The level of significance at which the null hypothesis will be rejected is .05.

Scope and Limitations

This study was limited by the following factors:

1. Due to the time factor subjects were not pre-tested for their level of motor ability.
2. The exact environmental conditions were not controlled. However, the investigator conducted classes only on the days when conditions were similar (40-45 degrees and no wind).

This study was delimited by the following factors:

1. The task of skiing was a novel skill to all subjects.
2. Six males and fourteen females were used for the study between the ages of twelve and seventeen.
3. This study was only concerned with the question of the progression of straight running to the wedge and wedge turn as defined in the A. T. M. manual (27:21-23).
4. This study was only concerned with the initial two hour period of instruction.
5. All students were using Rossignol rental skis, Garmont rental boots and A & T poles during the study.

Assumptions

The study was dependent upon the following assumptions:

1. The quality of participation during the training and testing periods was dependent upon the integrity of the subjects.
2. All the scores graded by the same standards throughout the test.

Definition of Terms

For the purpose of this study the following terms were used as defined:

1. A. T. M.: The American Teaching Method (27:3-4).

2. Fall-line: The shortest line down a slope, the line of least resistance. The line a free moving body would follow if influenced by gravity alone (26:41).

3. Pivot Turn: The skier is in a natural stance on the snow with the skis perpendicular to the fall-line. The skier, taking small steps, turns the skis in the direction he or she wants to be facing. It is a stationary turn.

4. P. S. I. A.: The Professional Ski Instructors of America.

5. Quality of Participation: This term shall mean the degree of excellence exhibited through functional effectiveness and efficiency.

6. Sidestepping: The skier is in a natural stance on the snow with the skis about hips width apart. The skier takes small steps, stepping up or down the hill keeping the skis across the fall-line at all times.

7. Straight Running: The skis are flat on the snow and approximately hips width apart. The skier's weight is equally distributed; ankles, knees, and torso are slightly flexed. The elbows are flexed, hands hip-high, forward and slightly off the body (26:43).

8. Task: An activity that can be used to measure performance or learning.

9. Transfer: The effect that practice of one task has upon the learning or performance of a second task.

10. Wedge: The tips of the skis are approximately four inches apart. The tails of the skis are displaced at equal angles, slightly wider than the hips. The surfaces of the skis are at right, lateral angles to the lower legs. The weight of the skier is distributed on both skis equally (26:43, 27:21).

11. Wedge Turn: From the wedge, weight is slightly transferred to the outside ski of the turn accomplished by steering of the skis in the direction of the intended turn (26:45).

CHAPTER II

REVIEW OF LITERATURE

The purpose of this study was to investigate the relative benefits of straight running as a preliminary maneuver to a wedge and wedge turn. Although several teaching manuals and books by experts appear in the literature (17,27,40) there is little published research regarding this topic. Several theories underlying skill learning substantiate the use of straight running as a preliminary exercise, but at least one basic concept, the law of specificity, does not support the use of straight running as an important contributor to skiing skill.

This chapter is divided into four sections. The first section deals with the teaching methods that are presently being used. Sections two and three discusses learning theory which encompasses the transfer of training in the learning of a task and task difficulty. Section four deals with specificity as it relates to the problem of this study.

Teaching Methods Presently Used

Professional literature in ski teaching methods unanimously supports the use of straight running as a preliminary exercise (11,20, 26,27,31,36). A commonly used ski text is the American Teaching Methods manual published by the Professional Ski Instructors of America which states, "In straight running the student aquires a basic feel for balance in motion and develops the kind of athletic stance he

will use for every other maneuver." (27:21) Teaching methods in Europe also incorporate straight running as an exercise before introducing other more complex maneuvers (17,25,31).

The principle of using straight running as an initial sliding maneuver that proceeds the wedge and wedge turn is supported by many qualified coaching experts. Warren Witherell (40:72-8), director of the Burke Mt. Alpine Training Center, stressed in his book that maintaining good balance is necessary for beginning skiers and essential for intermediate and advanced skiers. He suggests that the straight running exercise will help develop dynamic balance necessary for sliding. Georges Joubert (18:19-20), coach of the French National Ski Team, also affirms the use of straight running as a maneuver to help develop balance while in motion on the snow.

Many sources relating straight running and the wedge turn as beginning maneuvers in skiing have been out for several years (15,21, 38). Among these, Norbert Gemsch (14:25) states, "The first objective in skiing is to maintain a balanced stance, this can be accomplished while practicing the straight run."

Jerry Winter (1:27-28), a former ski school director now a recognized ski writer, discusses the problem of balance as a stable, natural, comfortable stance with weight square over the feet such as a position of athletic readiness found in many sports. This balance starts with straight running down an easy slope. It is also and excellent means for sharpening the kinesthetic senses as one improves.

Ski Magazine's Encyclopedia of Skiing also supports straight running as the first sliding maneuver before the wedge and wedge turn.

"Learn proper downhill position thoroughly because it is basic to all subsequent maneuvers that you will perform . . . you will find this stance both necessary and perferable in advanced skiing." (29:121)

Finally, Peter Estin (11:21) recommends:

> Once we've learned to get up the hill the next objective is to come down, safely and under control. To teach this most effectively, certified professional instructors today use some form of methodical approach to the American Ski Technique. We begin by learning the straight running position . . . these rudiments, learned in the earlier stages of your skiing experience will prove valuable later.

College educators have also recommended the use of straight running. Robinson (28), Tucker (36), and Twardokens (37) indicated that straight running is an excellent maneuver for beginning skiers to practice because the skier can acquire the necessary balance and stability needed for more advanced maneuvers.

Transfer of Training

The transfer of training is one of the most important topics in the psychology of learning. Deese (8:213) concludes that there is no more important topic. Oxendine (24:71) comments, "No other single topic in education has proven more popular during the past seventy-five years than the matter of transfer of training. Perhaps no topic is more important."

Most learning theorists similarly define transfer. Cratty (6: 283) describes transfer as the effect learning one task has upon the learning of a second task. Travers (35:188) defines transfer of training as, "Transfer of training occurs whenever the existance of a previously established habit has had as influence upon the acquisition, performance, or relearning of a second habit." This transfer can be

positive, negitive or ineffective (10:3).

Much of the early work in transfer was based in the formal discipline theory: skill will transfer to a second task provided the first task required difficult mental exercise (8:217-218). This theory has been tested by studying the effect that learning Latin had on the ability to improve mastery of English grammer. Most of the research involving this academic controversy proved the theory to be quite inadequate (24:72-3, 33,34).

Thorndike (32:76) proposed his "identical elements" theory of transfer because of the inadequecies of these earlier studies. This theory predicts that transfer between any two tasks will be dependent on the amount of similarity between the two tasks.

Thorndike's theory did not satisfy all learning theorists, for it contrasted sharply with the "general principles" position of transfer. The theory states that there are certain general principles or ideas which may transfer from one task to another.

In a study by Deese (8:218-19) he comments that the two theories should not be seen as contrasting, that is, mutually exclusive of one another, but that the real answer probably combines the two.

Finally, it has been suggested that transfer may occur between tasks judged to be similar in perceptual components. Vincent (39) found transfer occurred between two tasks similar in perceptual components (balance, laterality and stimulus color or shape) but different in motor components (total body versus arms and hands only). He suggested that the transfer phenomena could be explained through similarity between the perceptual aspects of the two tasks. In the perceptual

process (1) set, (2) stimulation, (3) reception, (4) perception, (5) decision, (6) action, and (7) evaluation, steps 1-4 were considered similar by Vincent in his two tasks. Identical task elements were eliminated by using grossly differing motor skills.

Task Difficulty

When the ultimate goal is skill in a particular activity, the instructor may proceed in one of three ways: (1) simple to complex, (2) the specific skill in its entirety, or (3) complex to simple, having the learner over come the extreme difficulties of the specific task before undertaking the precise task (12:447).

Theoretically, it is logical to follow a consistant procedure, to master simple skills before learning a more difficult one. In a study by Barch and Lewis (4), 230 airmen were trained on the Iowa Pursuit Apparatus. Four tasks were involved: the standard, first-learned task, two intermediate tasks and one difficult task. The researchers found greater positive transfer from a simple to a difficult task than from a difficult task to a more difficult task or from tasks of equal difficulty. Kaestner and Grant (19) found that early tracking on a simple task seemed to improve later training and testing on a more complex task; initial training on the difficult task followed by later training on the simpler task was not effective in transfer.

Contrarily, studies have found that more positive transfer takes place when learning a difficult task then a simple task (3,13). According to Jones and Bilodeau (16), positive transfer was best accomplished when the initial task was complex and the transfer task was

simple. Day (7) indicated that it was easier to transfer training from a difficult task to a simple task than to transfer from a relatively easy task to a more difficult one. This conclusion was reached as a result of a review and summary of studies concerning task difficulty. In his review Day encountered the problem of variation in experimental results from study to study as a result of inconsistencies in defining task difficulty.

In summary, research in the area of task difficulty has attempted to show the different ways one may train for an activity in terms of its difficulty. In some cases (4,19) it was better to train for transfer on an easy task before a more difficult one. Other investigators (5:158-60,3,7,13,16) have produced evidence supporting the position that it is better to practice a task more difficult than the one which will eventually be performed.

Specificity of Learning

Each motor skill or activity requires a unique blend of bodily responses. There are those who believe that transfer of learning becomes proportionally better as the tasks become more similar. In particular, studies by Namikas and Archer (23) and Lordahl and Archer (22) indicated that each learning situation is so unique that practice is most efficient when the skill practiced is, as near as possible, identical to the skill to be performed.

Perrin (24:279) in 1921, attempted to identify fundamental motor components which would serve as a basis for general motor performance. He administered three complex motor tests and fourteen simple motor tests to college students. He found little correlation

among these tests and concluded that motor ability is specific to the particular task.

Bachman (2:11) conducted a study which offered further support to the forementioned position. He had subjects perform two balance type tasks. He observed no significant relationship between the groups in the rate of learning. He concluded that the results substantiate the theory of task specificity of motor abilities.

Henry reviewed research regarding specificity as compared with generality of motor learning ability. He indicated that numerous test batteries would, by necessity, give some appearance of a general motor ability, even if there was none. Although he concluded that the ability to learn and perform in motor activities was extremely task specific. He stated that, " . . . individual differences in ability to profit by practice are specific to that skill and definitely do not predict the ability to improve by practice in some other skill." (24:280)

To summarize, the findings in the literature reviewed on specificity indicated that practice was most efficient when it very nearly or exactly represented the performance. When a practice task deviates even slightly from the criterion test, a slightly different set of neuromuscular responses are elicited.

CHAPTER III

RESEARCH PROCEDURES

The purpose of this study was to investigate the effects of teaching straight running as a preliminary maneuver to the wedge and wedge turn. Included within this chapter is a discussion of the selection, assignment, and orientation of the subjects; the general design; training and testing procedures; scoring procedures; and the statistical design.

Selection and Assignment of Subjects

Twenty students from the Snow Valley Ski School located in the San Bernardino Mountians volunteered to participate as subjects for the study. The requirements for acceptance as volunteers were: (1) skiing was a novel task to all; and (2) all students who participated were using Rossighol rental skis, Garmont rental boots and A & T poles which were donated by the Snow Valley Rental Shop for the purpose of this study. The assignment of subjects into specific groups will be discussed under the heading of Experimental Design.

Orientation of Subjects

The subjects were familarized with the nature of the study at the time they volunteered. During this phase they were told that they would participate in a normal ski lesson which would last approximately two hours. The actual teaching progression was not explained. They were also told that three ski instructors would be observing the class

throughout the lesson.

Experimental Design

The study was conducted for two consecutive days at the Snow Valley Ski Area. Two different groups of ten students seven females and three males in each group between the ages of 12 and 17, volunteered to take part in the study each of the two days. Both groups of students were taught in the standard A. T. M. progression (27:20-23) with the following exception. The subjects in the experimental group were taught straight running as a preliminary exercise to the wedge and wedge turn. The control group was taught the wedge and wedge turn without the initial sliding maneuver of straight running.

Training and Testing Procedures

All of the subjects in the study were taught in the same progression as suggested by the A. T. M. manual (27:20-23) up until the initial sliding maneuver. The progression was as follows: familiarization of ski equipment; walking; sidestepping; and the pivot turn. This part of the training took approximately thirty minutes for each group. The teaching progression at this point varied according to the prescribed conditions for the experimental and control groups.

The students on the first day were taught straight running as a preliminary exercise to the wedge and wedge turn. The second group of subjects were taught the wedge and wedge turn without the initial sliding maneuver of straight running. This phase of the lesson took approximately forty-five minutes. When the students progressed to the wedge turn they were taught and tested identically.

Both groups were explained the wedge turn and were given two training turns, one to the right and one to the left. For testing purposes, the subjects were instructed to make a turn to the right and stop, then a turn to the left and stop followed by another turn to the right and stop and a turn to the left and stop.

Scoring Procedures

Three instructors volunteered to score the subjects for the study. They were chosen from a group of eleven associate-certified ski instructors at the Snow Valley Ski Area on the basis of senority and qualifications as ski teachers.

The observing instructors were told to score all subjects as they made each of the four wedge turns during the testing phase. The instructors scored on a 1-10 scale, grading the subjects on the ability to turn. (See Appendix A)

Statistical Design

The two groups scores were examined for differences in learning by using the t ratio. The mean scores of the two groups were compared to determine the significance of the difference between them at the conclusion of the study.

CHAPTER IV

ANALYSIS AND DISCUSSION

The purpose of this study was to investigate the effect of straight running on learning the wedge and wedge turn. The following data was gathered and analyzed to test the following null hypothesis: There will be no significant difference in improvement between the group being taught straight running as a preliminary maneuver to the wedge and wedge turn and the group being taught to make a wedge then wedge turn.

The purpose of this chapter is to present an analysis of the data collected. Included in this chapter is the objectivity of the judges, the data, and a discussion of the findings.

Objectivity of Judges

In order to determine the objectivity of the test it was necessary to determine an inter-judge objectivity coefficient. A correlation coefficient was computed between judges, the results of that computation are presented in the following table:

Table 1

Objectivity of Judges

Judge A compared with judge B	r= .95*
Judge A compared with judge C	r= .97*
Judge B compared with judge C	r= .94*

*All correlation coefficients are significent at the one percent level

of confidence.

Data

The experimental data was gathered by scoring the subjects as they made four wedge turns in the testing phase of the lessons. From the data obtained a t test was used to determine if significant improvement had occurred between the experimental group and the control group which did not use straight running in the teaching sequence. A value of .81 was obtained from the data (Table 2), a t value of 2.10 was needed for significance at the .05 level of confidence, hence significance was not found.

Table 2

Comparison of Mean Gains for Groups

Group	N	Mean		m	d	t	Significance
Experimental with St. running	10	90.6	14.74	4.66	6.40	.81	Not Significant at .05 Level
Control without St. Running	10	95.8	13.89	4.39			

Discussion of Findings

An analysis of the data revealed that there was no significant differences between the experimental group and the control group. The test failed to show the significance of using straight running as a preliminary maneuver to the wedge and wedge turn. Therefore, the use of straight running does not contribute significantly to the progression used by most ski instructors in beginning classes. The initial sliding maneuver of straight running does not facilitate the learning of the wedge and wedge turn. Eliminating straight running from the

teaching sequence would reduce the time and simplify the process of learning to ski.

It is the investigators opinion that this study would support the findings by Namikas and Archer (23), Perrin (24) and Bachman (2) which deals with the specificity of learning. Their findings indicate that for practice to be most efficient the lead-up skill should be as near as possible, if not identical, to the skill to be performed. Specific to this study, in teaching the wedge and wedge turn without using straight running as a preliminary exercise, the subject is learning the specific task, the wedge turn. This supports the concept of specificity.

Chapter V will present the conclusions based on the analysis and interpretation of the test data.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to investigate the effect of teaching straight running on learning the wedge and wedge turn. The justification for this study relates to the importance of straight running as an integral part of the ski teaching progression. Elimination of this maneuver could decrease the learning time of the student and also simplify the learning process. On the other hand, if straight running did effect the learning of the wedge and wedge turn then this study would help substantiate its use.

Twenty subjects, six males and fourteen females from the Snow Valley Ski Area volunteered to take part in this study. Half of the subjects formed the experimental group which used straight running as a preliminary exercise to the wedge and wedge turn. The other half made up the control group which did not use straight running in the teaching sequence. The training and testing encompassed two days with each group being trained and tested on one of the two days.

In the testing phase both groups were asked to make four wedge turns. Three observing ski instructors scored each of the students on each of the four wedge turns. A t test was used to determine if significant improvement had occurred between the two groups. Evaluation of the data by the t test indicated no significant differences in the two different teaching methods resulted. This resulted in an acceptance

of the null hypothesis: There would be no significant difference in improvement between the group being taught straight running as a preliminary maneuver to the wedge and wedge turn and the group being taught to make a wedge and wedge turn.

Conclusion

The null hypothesis based on the findings and within the limitations of the research was accepted. It was concluded that the ability of a student to learn the wedge and wedge turn was not dependent upon practicing straight running as a preliminary maneuver. More directly, practice on the specific task produces the same results as practicing for transfer and/or progressing from a relatively simple task to a more difficult one.

Recommendations for further study.

It is recommended that the following areas be considered for further studies:

1. This study added to the limited research in the field of ski teaching. Investigators should examine other segments of the teaching sequence in order to determine the effect of various preliminary maneuvers.

2. Within the parameters of the present study other variables could be added to test the hypothesis stated in this study. The variables are sex and different age groups. There may be differences between different age groups. Young children may not need straight running as a preliminary maneuver because of their lack of fear while older students, late 20's and older, might benefit from straight

running because of their apprehensions. There might also be a difference in the benefits of straight running between the two sexes.

3. Within the parameters of the present study, the investigator should consider testing the subjects after they have been trained on linked wedge turns. During linked wedge turns there is a point at which the student brings the skis together, such as in straight running, and the effect of transfer and specificity may show up during this phase of the progression.

BIBLIOGRAPHY

BIBLIOGRAPHY

1. Auran, John H. and Jerry Winter. The Ski Better Book. New York: Dial Press, 1975.

2. Bachman, John C. "To Improve Shooting Accuracy, Practice at Small Baskets," Athletic Journal, 42: 34, 1961-1962.

3. Barch, A. M. "The Effect of Difficulty of Task on Proactive Facilitation and Interference," Journal of Experimental Psychology, 46: 37-43, 1953.

4. _____, and D. Lewis. "The Effect of Task Difficulty and Amount of Practice on Proactive Transfer," Journal of Experimental Psychology, 48: 134-42, 1954.

5. Bartlett, F. C. The Mind at Work and Play. London: George Allen and Unwin, 1951.

6. Cratty, Bryant J. Movement Behavior and Motor Learning. Philadelphia: Lea and Febiger, 1968.

7. Day, R. H. "Relative Task Difficulty and Transfer of Training in Skilled Performance," Psychological Bulletin, 53: 160-68, 1956.

8. Deese, James. The Psychology of Learning. New York: McGraw-Hill, 1959.

9. Drowatzky, John N. Motor Learning: Principles and Practices. Minnesota: Burgess Publishing Company, 1975.

10. Ellis, Henry C. The Transfer of Learning. New York: The Macmillian Company, 1969.

11. Estin, Peter. Skiing the American Way. New York: John Day Co., 1964.

12. Evans, Harold and Brian Jackman. We Learned to Ski. New York: St. Martin's Press, 1975.

13. Gagne, R. H., K. E. Baker, and H. Foster. "Transfer Discrimination Training to a Motor Task," Journal of Experimental Psychology, 40: 314-28, 1950.

14. Gemsch, Norbert and August Julen. Modern Skiing. New York: Barnes and Noble, Inc., 1965.

15. Iselin, Fred and A. C. Spectorsky. Invitation to Modern Skiing. New York: Simon and Schuster, 1965.

16. Jones, E. I. and E. A. Bilodeau. "Differential Transfer Training Between Motor Tasks of Different Difficulty," Research Bulletin, 52: 35, 1952 (Psychological Abstract, 1953).

17. Joubert, Georges and J. Vuarnet. How to Ski the New French Way. New York: The Dial Press, Inc., 1967.

18. _____. Teach Yourself to Ski. Colorado: Aspen Ski Masters, 1970.

19. Kaestner, N. F. and D. A. Grant. "Transfer of Training in Tracking as a Function of the Predictability of Unidimensional Target Courses," Journal of Genetic Psychology, 55: 103-16, 1956.

20. Kidd, Billy. Ski in Six Days. Chicago: Henry Regney Co., 1975.

21. Kuns, Richard. The Skier's Handbook. New York: Harper and Row, 1965.

22. Lorhahl, D. S. and J. E. Archer. "Transfer Effects on Rotary Pursuit Task as a Function First Task Difficulty," Journal of Experimental Psychology, 56: 421-26, 1958.

23. Namikas, Gediminas and E. J. Archer. "Motor Skill Transfer as a Function of Inter-Task Interval and Pre-Task Difficulty," Journal of Experimental Psychology, 59: 109-12, 1960.

24. Oxendine, Joseph B. Psychology of Motor Learning. New York: Appleton, Century, Crofts, 1968.

25. Palmedo, Ronald. The New Official Austrian Ski System. New York: A. S. Barnes and Company, 1961.

26. Professional Ski Instructors of America. The Official American Ski Technique. New York: Cowles Book Company, Inc., 1970.

27. _____. American Teaching Methods. New York: The Hart Co., 1974.

28. Robinson, Gwen. Skiing: Conditioning and Technique. Los Angeles: Mayfield Publishing Company, 1974.

29. Scharff, Robert. Ski Magazine's Encyclopedia of Skiing. New York: Harper and Row, 1974.

30. Singer, Robert N. Motor Learning and Human Performance. New York: The Macmillian Company, 1975.

31. Swiss Ski Federation. The Technique of Skiing. Switzerland: Inter-Association for Skiing, 1960.

32. Thorndike, E. L. Educational Psychology. New York: Lemcke and Bueckner, 1903.

33. _____. "The Influence of First Year Latin Upon the Ability to Read English," School and Society, 17: 165-68, 1923.

34. _____, and G. E. Ruger. "The Effect of First Year Latin Upon knowledge of English Words of Latin Devivation," School and Society, 18: 260-70, 1923.

35. Travers, Robert M. W. Essential of Learning. New York: The Macmillian Company, 1964.

36. Tucker, Karl and Clayne Jensen. Skiing. Iowa: William C. Brown Company, 1976.

37. Twardokens, George and Art Broten. Skiing. Los Angeles: Goodyear Publishing Company, Inc., 1971.

38. Valar, Paul. How to Improve Your Skiing. Chicago: The Athletic Institute, 1958.

39. Vincent, William J. "Transfer Effects Between Motor Skills Judged Similar in Perceptual Components," Research Quarterly, 39: 380-88, 1968.

40. Witherell, Warren. How the Racers Ski. New York: W. W. Norton and Company, Inc., 1972.

APPENDICES

APPENDIX A

SCORING CRITERIA FOR JUDGES

SCORING CRITERIA FOR JUDGES

Judges will score on a ten point scale with ten representing the highest score and one representing the lowest score. Judges should keep in mind that the subjects can be capable of scoring a ten on any of the four turns during the testing phase of the lesson. The scoring criteria is as follows:

10 Subject demonstrates correct initiation, follow through and completion of the turn with the proper body, head and hand position over the skis. The skier also has good balance. The skier's position should be congruent with the A. T. M. manual (26:45,27:21).

9 Subject demonstrates good body, head and hand positioning over the skis. The skier demonstrates only minor flaws in overall use of the skis. Skier has good balance.

8 Subject demonstrates ability to turn. The movements of the skier are deliberate but strong with fair body position over the skis. The skier also demonstrates good balance.

7 Subject demonstrates ability to turn with no hesitation during the turn. The movements of the skier are slow and deliberate with the ability to balance over the skis.

6 Subject demonstrates ability to turn with only some hesitation during any one part of the turn. The body position over the skis is lacking with the skier looking down at his or her skis. Balance is maintained by the skier.

5 Subject demonstrates ability to turn but with definite hesitation during the completion phase of the turn. The body positioning over the skis is poor with much movement in the arms during the completion of the turn. The skier also looks down at his or her skis while in motion. The subject is having a little trouble with balance.

4 Subject demonstrates ability to initiates turn correctly with some follow through of the turn but is weak in completing the turn. The student has poor body position with some problems in balancing over the skis.

3 Subject demonstrates ability to initiate a turn but is weak in ability during the follow through phase of the turn with no completion of the turn. The skier's body position is poor along with his or her balance.

2 Subject demonstrates very little ability to turn with poor body positioning and poor balance is exhibited over the skis.

1 Subject demonstrates complete lack of ability to turn with very poor body position and balance over the skis.

APPENDIX B

RAW DATA FROM EXPERIMENTAL GROUP

RAW DATA FROM EXPERIMENTAL GROUP

Scores

Judges	Subjects	Lt. Turn	Rt. Turn	Lt. Turn	Rt. Turn	Total Points
A	1	9	7	7	6	29
	2	6	8	7	7	28
	3	9	7	9	10	35
	4	7	10	10	10	37
	5	4	7	6	8	25
	6	4	7	8	7	26
	7	10	9	10	9	38
	8	7	7	7	7	29
	9	6	7	6	8	27
	10	7	6	6	7	26
B	1	9	8	6	8	31
	2	7	9	5	7	38
	3	10	7	8	9	34
	4	9	10	9	10	38
	5	7	6	5	7	25
	6	6	7	8	8	29
	7	8	9	9	10	36
	8	5	7	7	8	27
	9	5	6	8	8	27
	10	8	7	6	7	28
C	1	9	7	7	8	31
	2	7	8	7	7	29
	3	10	9	10	10	39
	4	9	10	9	10	38
	5	5	5	5	6	21
	6	6	5	8	8	27
	7	9	9	9	10	37
	8	7	7	7	7	28
	9	6	6	7	7	26
	10	6	7	7	8	28

APPENDIX C

RAW DATA FROM CONTROL GROUP